

REMARKS

Claims 1-23 remain in the application. Claims 24-30 have been canceled and claim 31 has been withdrawn by this amendment.

The present application has been rejected under restriction requirement of 35 U.S.C. 121, and also under double patenting, 35 U.S.C.102(e), and 35 U.S.C.103(a).

In response to the restriction requirement of the Action, the applicants hereby confirm that, during a telephone conference between the Examiner and the applicants' attorney, Mark G. Lappin, on December 28, 2004, the applicants have selected without traverse to prosecute claims 1-30. Accordingly, the applicants withdraw claim 31 without prejudice. The applicants reserve the right to refile this claim in a separate application.

Claims 1-3, 5-9, and 23 were rejected under judicially created doctrine of double patenting over claims 1-3, 4, and 6-9 of U.S. Patent No. 6,673,694. The applicants hereby submit a terminal disclaimer with this response to overcome the double patenting rejection. Therefore, the double patenting rejection should be withdrawn.

The applicants have amended claims 1 and 23 to more clearly define the invention and have canceled claims 24-30. The present application as originally filed supports the amendments. No new matter has been added. In view of the above amendments, remarks, and the following arguments in response to the 35 U.S.C.102(e) and 35 U.S.C.103(a) rejections, the applicants respectfully submit that the present application is in condition for allowance.

Claim Rejections-35 U.S.C. 102

Claims 1-3, 5-9, 11, 13-15, and 23 were rejected under 35 U.S.C.102(e) as being anticipated by U.S. Patent No. 6,277,666 to Hays. Claims 1 and 23 are independent claims. Claims 2, 3, 5-9, 11, and 13-15 depend directly or indirectly from claim 1. By this amendment, claims 1 and 23 have been amended to more clearly define the invention.

Hays teaches a process having a structural etch (Step 64 in FIG.3) performed before the

SOI wafer is bonded to the substrate wafer (Step 66 in FIG.3). After the SOI wafer is bonded to the substrate, the handle layer is removed (Step 68 in FIG.3), typically by wet etch. The dielectric layer (SiO_2) is then removed to free the silicon component of the MEMS device (Step 70 in FIG.3). The dielectric SiO_2 layer, typically 1-3 μm thick, functions as an etch stop. The wet etch which removes the handle layer Si must completely stop on the thin SiO_2 layer. Otherwise, the etch chemicals may penetrate the device underneath the SiO_2 layer and destroy the device. In the process disclosed by Hays, the device layer is etched before the steps of removing the handle and SiO_2 layers. Part of the SiO_2 layer has no Si underneath to mechanically support the SiO_2 layer. It may result that the etch chemicals penetrate the thin SiO_2 layer and destroy the device during fabrication.

The present invention is directed to a process in which the SOI wafer is first bonded to the substrate, the handle layer and the SiO_2 layer are removed, and then the structural etch is performed on the device layer. The process claimed in the amended claims 1 and 23 requires that the step (f), performing a structural etch on the device layer, be performed after step (e), removing the dielectric layer. In other words, the amended claims require that the structural etch on the device layer be performed after removing the dielectric layer of the SOI wafer. When the handle layer is removed, the SiO_2 layer is fully supported by the underlying device layer, thus the SiO_2 layer functions as an etch stop, providing a better protection to the underneath device layer than the prior art device. Also, the structure of the device has not been formed, and thereby, the etch chemicals cannot destroy the device. Therefore, the present invention as claimed in the independent claims 1 and 23 is distinguishable from the process disclosed in Hays.

Claims 2, 3, 5-9, 11, and 13-15 depend directly or indirectly from claim 1. Therefore, claims 2, 3, 5-9, 11, and 13-15 should be considered patentable over Hays.

Claim Rejections -35 U.S.C. 103

In *Item 11* of the Action, claim 4 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Hays in view of U.S. Patent No. 6,431,714 to Sawada et al.

Claim 4 depends from claim 1 and provides further limitations to claim 1. As discussed

in the previous section, claim 1 should be considered patentable over Hays because Hays does not teach a process having the structural etch performed after the SOI wafer has been attached to the substrate and the handle and SiO₂ layers of the SOI wafer have been removed. Sawada et al. also does not teach the required limitation in claim 1. Therefore, claim 1 should be considered patentable over Hays in view of Sawada et al. The dependent claim 4, which includes all the limitations of claim 1, also should be considered patentable over Sawada et al.

In *Item 12* of the Action, claims 16 and 24 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Hays in view of U.S. Patent No. 6,077,721 to Fukada et al. or U.S. Patent No. 6,433,401 to Clark et al.

Claim 16 depends from the independent claim 1 and provides further limitations to claim 1. Hays does not teach a process having the structural etch performed after the SOI wafer has been attached to the substrate and the handle and SiO₂ layers of the SOI wafer have been removed. Neither Fukada et al. nor Clark et al. teaches a process having a structural etch performed after the SiO₂ layer of the SOI wafer is removed. Therefore, claim 1 and the dependent claim 16 should be considered patentable over Hays in view of Fukada et al. or Clark et al.

Claim 24 has been canceled by this amendment. Therefore, the rejection to claim 24 becomes moot now.

In *Item 13* of the Action, claims 10, 12, 17-20, and 25-28 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Hays in view of U.S. Patent No. 5,760,443 to McCarthy.

Claims 10, 12, and 17 depend from claim 1 and claims 18-20 depend from claim 17. As discussed above, claim 1 should be considered patentable over Hays because Hays does not teach a process having the structural etch performed after the SOI wafer has been attached to the substrate and the handle and SiO₂ layers of the SOI wafer have been removed. McCarthy does not teach such limitation as claimed in claim 1 either. Therefore, the independent claim 1 and the dependent claims 10, 12, and 17-20, which provide further limitations to claim 1, should be considered patentable over Hays in view of McCarthy.

Claims 25-28 have been canceled, and therefore, the rejections become moot now.

In *Item 14* of the Action, claims 22 and 30 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Hays in view McCarthy and further in view of Clark et al.

Claim 22 depends from claim 17, which depends from claim 1. Claim 1 should be considered patentable over Hays in view McCarthy and further in view of Clark et al. because none of the references teaches a process having the structural etch performed after the SOI wafer has been attached to the substrate and the handle and SiO₂ layers have been removed. Therefore, the dependent claim 22 should be considered patentable over Hays in view McCarthy and further in view of Clark et al.

Claim 30 has been canceled by this amendment, and therefore, the rejection to claim 30 becomes moot now.

In *Item 15* of the Action, claims 21 and 29 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Hays in view McCarthy and further in view of U.S. Patent No. 6,458,615 to Fedder et al.

Claim 21 depends from claim 17, which depends from claim 1. Fedder et al. does not teach a process having the structural etch performed after the SOI wafer has been attached to the substrate and the handle and SiO₂ layers of the SOI wafer have been removed. Therefore, claim 1 should be considered patentable over Hays in view McCarthy and further in view of Fedder et al. The dependent claim 21 provides further limitations to claim 1, and also should be considered patentable over Hays in view McCarthy and further in view of Fedder et al.

Claim 29 has been canceled by this amendment, and therefore, the rejection to claim 29 becomes moot now.

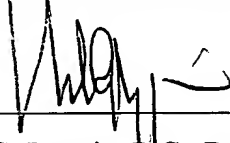
Conclusion

Applicants, accordingly, respectfully submit that in view of the preceding amendments and arguments, claims 1-23 are patentable over the cited references, whether considered alone or in combination, and respectfully request reconsideration and withdrawal of the rejections of these claims under 35 U.S.C. 102(e) and 35 U.S.C. 103(a). If a telephone conference will expedite prosecution of the application the Examiner is invited to telephone the undersigned.

No additional costs are believed to be due in connection with the filing of this paper. However, the Commissioner is hereby authorized to charge any additional fees, or credit any overpayment, to our Deposit Account No. 50-1133.

Respectfully submitted,
McDermott Will & Emery LLP

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